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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,913	06/15/2001	Takeshi Okazawa	NE222-US	6135

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EXAMINER
QUINTO, KEVIN V

ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/880,913	OKAZAWA, TAKESHI	
	Examiner	Art Unit	
	Kevin Quinto	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3 and 4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. Figures 4(a), 4(b), 4(c), and 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

3. Claim 4 is objected to because of the following informalities: the word *fourth* is misspelled as "forth." Appropriate correction is required.

4. Claims 8 and 9 are objected to because of the following informalities: the word *field* is misspelled as "filed." Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 1 uses the phrase "said memory element" however claim 1 previously defines two memory elements. It is unclear to the examiner as to which memory element is being referred to by "said memory element." Therefore the examiner has interpreted "said memory element" as referring to either (first or second) of the memory elements.

8. Claim 7 uses the phrases "magnetizing one or more of said ferromagnetic thin films of said first memory element in a direction parallel to or antiparallel to a direction of magnetization of the remaining ones of said ferromagnetic thin films other than said one or more of said ferromagnetic thin films" and "magnetizing one or more of said ferromagnetic thin films of said second memory element in a direction parallel to or antiparallel to a direction of magnetization of the remaining ones of said ferromagnetic thin films other than said one or more of said ferromagnetic thin films." However the examiner is unable to determine the metes and bounds of the phrase "magnetizing one or more of said ferromagnetic thin films of said first memory element in a direction parallel to or antiparallel to a direction of magnetization of the remaining ones of said ferromagnetic thin films other than said one or more of said ferromagnetic thin films" since the claim does not clearly describe the films which are "other than said one or more of said ferromagnetic thin films." To the examiner's best understanding, each memory element has at least two ferromagnetic layers or two groups of ferromagnetic

layers which are pinned and is described by this phrase portion: "magnetizing one or more of said ferromagnetic thin films of said first memory element in a direction parallel to or antiparallel to a direction of magnetization of the remaining ones of said ferromagnetic thin films..." The remaining portion of the phrase, "other than said one or more of said ferromagnetic thin films" renders the claim indefinite, since to the examiner's best understanding, there are only two ferromagnetic layers or two groups of ferromagnetic layers to be pinned within each memory element. The examiner finds the phrase, "magnetizing one or more of said ferromagnetic thin films of said second memory element in a direction parallel to or antiparallel to a direction of magnetization of the remaining ones of said ferromagnetic thin films other than said one or more of said ferromagnetic thin films" to be indefinite on the same grounds.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakajima et al. (USPN 6,473,336 B2).

11. So far as understood in claim 1, Nakajima et al. (USPN 6,473,336 B2, hereinafter referred to as the "Nakajima" reference) discloses a similar device. Figures 16, 17, 18A, 18B, 19, and 20 of Nakajima disclose a nonvolatile semiconductor memory device comprising a first wiring (113) extending in a first direction and a first memory element (121, 122, 123) which is connected to the first wiring. A second wiring (124) extends in a second direction (which is different from the first direction), and is connected to the first memory element (121, 122, 123). There is a second memory element (125, 126, 127) which is connected to the second wiring (124). There is a third wiring (112) which extends in the first direction and is connected to the second memory element (125, 126, 127). The first memory element (121, 122, 123) is made of two ferromagnetic films (121, 123) which are adjacent to opposite sides of an insulation film (122). The first wiring (113) is connected to a ferromagnetic film (121) while the second wiring (124) is connected to the other ferromagnetic film (123). The second memory element (125, 126, 127) is made of two ferromagnetic films (125, 127) which are adjacent to opposite sides of an insulation film (126). The second wiring (124) is connected to a ferromagnetic film (125) while the third wiring (112) is connected to the other ferromagnetic film (127). A piece of information is stored by a difference in magnetization direction between the ferromagnetic films. This piece of information is retrieved by using variations in electric resistance value of the memory element when a tunnel current flows through the memory element. The variations in the electric resistance value of the memory are caused by a magnetoresistive effect which results from a difference in direction between the magnetizations of two or more of the

ferromagnetic thin films. The first memory element (121, 122, 123) pairs off with the second memory element (125, 126, 127) without exception to store a piece of information opposed in meaning to that stored in the second memory element (125, 126, 127). The operation of this cell is explained in column 19, lines 12-43.

12. So far as understood in claim 2, it is understood that the device of Nakajima has a plurality of first and second memory elements as well as a plurality of first, second, and third wirings. Although not shown, it is also understood that a write and a read circuit are configured with the memory cells in order to store and write information.

13. So far as understood in claim 3, the first direction is perpendicular to the second direction.

14. So far as understood in claim 4, the first (113), second (124), and the third (112) wirings are each on their own respective planes. The third plane is over the second plane while the second plane is over the first plane. Although not shown, it is understood that the device of Nakajima has a plurality of first, second, and third wirings arranged parallel to each other on their own respective planes. The first memory element (121, 122, 123) is on a fourth plane which is parallel to the first plane and also between the first and second planes. The second memory element (125, 126, 127) is on a fifth plane which is parallel to the first plane and also between the second and third planes.

15. So far as understood in claim 5, it is understood that the write and the read circuits are made of a semiconductor integrated circuit.

16. So far as understood in claim 6, Nakajima has a group consisting of the first (121, 122, 123) and second (125, 126, 127) memory elements with the first (113), second (124), and third (112) wirings which are arranged through insulation films. It is understood that there are a plurality of groups.

17. So far as understood in claim 7, Nakajima discloses a device which utilizes a method of recording information which meets the claim. Figures 16, 17, 18A, 18B, 19, and 20 of Nakajima disclose a nonvolatile semiconductor memory device comprising a first wiring (113) extending in a first direction and a first memory element (121, 122, 123) which is connected to the first wiring. A second wiring (124) extends in a second direction (which is different from the first direction), and is connected to the first memory element (121, 122, 123). There is a second memory element (125, 126, 127) which is connected to the second wiring (124). There is a third wiring (112) which extends in the first direction and is connected to the second memory element (125, 126, 127). The first memory element (121, 122, 123) is made of two ferromagnetic films (121, 123) which are adjacent to opposite sides of an insulation film (122). The first wiring (113) is connected to a ferromagnetic film (121) while the second wiring (124) is connected to the other ferromagnetic film (123). The second memory element (125, 126, 127) is made of two ferromagnetic films (125, 127) which are adjacent to opposite sides of an insulation film (126). The second wiring (124) is connected to a ferromagnetic film (125) while the third wiring (112) is connected to the other ferromagnetic film (127). A piece of information is stored by a difference in magnetization direction between the ferromagnetic films. This piece of information is retrieved by using variations in electric

resistance value of the memory element when a tunnel current flows through the memory element. The variations in the electric resistance value of the memory are caused by a magnetoresistive effect which results from a difference in direction between the magnetizations of two or more of the ferromagnetic thin films. The first memory element (121, 122, 123) pairs off with the second memory element (125, 126, 127) without exception to store a piece of information opposed in meaning to that stored in the second memory element (125, 126, 127). The write operation of this cell is explained in column 19, lines 12-43. The first and second states are also defined such that one memory element has its films parallel to each other while the other memory element has its films antiparallel to each other (column 19, lines 12-25). It is also understood that the devices of figures 16, 17, 18A, 18B, 19, and 20 meet the read operation limitation since they all disclose the use of a sense amplifier which is connected to the memory elements.

18. So far as understood in claim 8, the devices of figures 19 and 20 meet this claim since it uses a first (113) wiring to create the magnetic field.

19. So far as understood in claim 9, the devices of figures 17, 18A, 18B, 19, and 20 meet this claim since a third wiring (112) is used to create the magnetic field.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quinto whose telephone number is (703) 306-5688. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

KVQ
June 22, 2003